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Technology, labour, and productivity potential in peasant agriculture: England, c.1000 to 1348

by Janken Myrdal and Alexandra Sapoznik

Abstract

The period between the eleventh and fourteenth centuries was one of rising population and increasing pressure on land and resources. Access to land per person and per household declined as peasant arable holdings were fragmented to make room for this growing population, and an increasing proportion of the population was left reliant on smallholdings from which to earn a living. How so many people were able to live off of so little land is a crucial problem in our understanding of the high and late medieval economy. Through examination of illuminated manuscripts, religious iconography, archaeological findings and written records, we identify a series of agricultural techniques, well suited to the growing number smallholding peasants, and argue that peasants were able to achieve high levels of land productivity through the labour-intensive use of small-scale technologies.

The period from the late eleventh century to the turn of the fourteenth was one of tremendous economic expansion in England. Much of this was driven by a growing population, which at least doubled and possibly tripled between 1086 and c.1300.¹ In many areas, rapidly rising population put increasing strain on arable resources. In response to this pressure, much new land was brought into cultivation through assarting and reclamation, and the amount of land under cultivation probably doubled over the period.² Nonetheless, continued population growth in many areas increased demand for land to such an extent that many peasants fragmented their holdings, giving rise to a substantial population of tenants and subtenants with very small holdings of only a few acres – far less than the 10 acres with which it has long been estimated was necessary to maintain a family on the thinnest edge of subsistence.³ By 1300 this process had advanced so far that an estimated 60 per cent of households in England were reliant upon smallholdings of less than 10 acres for their immediate needs.⁴ How this vast

¹ J. Hatcher, *Plague, population and the English economy, 1348–1530* (1977), p. 71.

² S. Broadberry et al., *British economic growth, 1270–1870* (2015), pp. 72–3.

³ A problem highlighted in B. M. S. Campbell, ‘The agrarian problem in the early fourteenth century’, *Past and Present*, 188 (2005), esp. pp. 53–62, in which he notes at p. 62, ‘it is the sheer number of smallholdings,

both villein and free, that is the single most arresting feature of the pattern of tenant property holding revealed by the Hundred Rolls’.

⁴ E. Miller and J. Hatcher, *Medieval England: rural society and economic change, 1086–1348* (1978), p. 395; C. Dyer, *Standards of living in the later middle ages: social change in England, c.1200–1520* (1989), p. 126; and H. E. Hallam, ‘Population movements in England,

population could be fed, given the amount of land to which peasant households had access and what is known of medieval agriculture, is an enduring problem in our understanding of the medieval economy.⁵

The extent to which an answer to this question lies in a significant productivity difference between peasants and their lords is, in the absence of direct data for peasant yields, a matter of much debate. Recent research based on manorial case studies in Cambridgeshire has suggested that peasants, particularly smallholding peasants, may have achieved higher yields than their lords by a margin of 10 to 25 per cent.⁶ However, it has yet to be determined whether the findings of these studies can be applied across the country. Indeed, Broadberry *et al.* contend that lords' access to the best land would have given them a natural advantage over their peasants. Thus they argue that demesne yields, for which there is much evidence, can be considered representative of medieval yields as a whole.⁷ Implicit in both of these arguments is the suggestion that peasants were working their land in ways which allowed them to achieve higher yields than those secured by lords, or simply allowed them to overcome their disadvantaged position in terms of land quality. Yet how peasants may have achieved these yields has yet to be understood. Certainly, the amount of labour used in preparing, cultivating and maintaining the soil was crucial to the land productivity of medieval agriculture. In this respect, peasants may have had a distinct advantage over their lords.⁸ Indeed, Bruce Campbell has calculated that smallholding peasants in eastern Norfolk could have expended six times as much labour on their holdings than did their lords.⁹ On peasant lands, much of this was family-based and was likely to have been more productive than the waged and customary labour upon which lords were reliant.¹⁰ Peasants therefore had access to a motivated and effective labour force that could be deployed with great intensity per unit area, particularly on small farms. What medieval peasants were doing with the labour available to them, by

Note 4 continued

1086–1350, in H. E. Hallam (ed.), *Agrarian history of England and Wales* [hereafter *AHEW*], II, pp. 508–93.

⁵ Compare for example B. M. S. Campbell, *English seigniorial agriculture* (2000), pp. 386–410 and D. Stone, 'The consumption of field crops in medieval England', in C. Woolgar, D. Serjeantson, and T. Waldron (eds), *Food in medieval England: diet and nutrition* (2006), pp. 19–21.

⁶ D. Stone, *Decision-making in medieval agriculture* (2005), pp. 269–71; Stone, 'Consumption', p. 21; A. Sapoznik, 'The productivity of peasant agriculture: Oakington, Cambridgeshire, 1360–99', *ECHR* 66 (2013), pp. 518–44. Even higher estimates are given in H. J. P. Le Poutre, 'Fertilization by manure: a manor model comparing English demesne and peasant land c.1300', *AgHR* 65 (2017), pp. 20–48.

⁷ Broadberry *et al.*, *British economic growth*, p. 90.

⁸ Outlined in M. Bailey, 'Peasant welfare in England, 1290–1348', *ECHR* 51 (1998), p. 228, although note also limits to this on p. 230. A similar line of thought is noted for eighteenth-century Poland in W. Kula, *An*

economic theory of the feudal system, trans. L. Garner (1976), pp. 116; and A. Kahan, *The plow, the hammer and the knout: an economic history of eighteenth-century Russia* (1985), pp. 67–8. Our thanks to Sheilagh Ogilvie and Tracy Dennison for these references. In the Duchy of Wroclaw, Hoffmann found smallholders paying rents four times as high as those for larger tenants, due to the productivity of their land: R. Hoffmann, *Land, liberties, and lordship in a late medieval countryside* (1989), p. 255.

⁹ B. M. S. Campbell, 'Agricultural progress in medieval England: some evidence from eastern Norfolk', *ECHR* 36 (1983), p. 39.

¹⁰ G. Dyer, 'Output per acre and size of holding: the logic of peasant agriculture under semi-feudalism', *J. Peasant Studies* 24 (1996), pp. 112–15; also Bailey, 'Peasant welfare', pp. 227–8. Both hired and family labour were likely to have been more productive than customary labour: D. Stone, 'The productivity of hired and customary labour: evidence from Wisbech Barton in the fourteenth century', *ECHR* 50 (1997), pp. 640–56.

what means it was applied to the land, and the potential consequences of this for peasant land productivity are the focus of this study.

Innumerable aspects determined the production aims of peasant households, of which the most important factors were access to land, labour and capital. On smallholdings, large quantities of labour could compensate for deficiencies in both capital and land, increasing land productivity at the expense of labour productivity.¹¹ Our focus in this study is on the most intense uses of labour to increase arable output over small areas. Although this does not by any means encompass all peasant households in medieval England, it does capture a substantial group of people who were operating under intense pressure. As noted above, smallholding peasants became an increasingly large proportion of the population over the thirteenth century. Many of these people would have been reliant on wage labour to supplement their incomes. Indeed wage income is used in model household budgets to explain how peasants could survive off very small parcels of land.¹² Yet the extent to which wage labour could sustain a large section of the population is debatable.¹³ Certainly many demesnes were heavily reliant on wage labour to supplement customary services in the latter part of the thirteenth century. But over the late thirteenth century agricultural wages fell, even as lords brought in more wage labour in their efforts to raise the productivity of their demesnes. The downward movement of wages at a time when wage labourers were in increasing demand indicates a surplus supply of wage labour.¹⁴ In this environment it seems probable that many people would have been unable to find enough work with which to substantially ameliorate their poverty.¹⁵ Therefore, although the opportunity for waged work was an important factor in the medieval peasant economy, it was not so abundant as to have fundamentally altered labour priorities within the majority of peasant households. Thus it is likely that most peasants would have focused on putting intense amounts of labour into household production, either for consumption or sale. The central issue here is not the extent to which smallholding peasants produced goods for consumption or market, but rather that conditions prevailed which would have encouraged cultivation techniques geared toward high land productivity, increasing produce to either eat or sell.

¹¹ Bailey, 'Peasant welfare', p. 231.

¹² For example, Dyer, *Standards of living*, p. 117.

¹³ Karakacili's estimates of labour productivity on the Ramsey Abbey demesnes clearly illustrate this point. At Elton, the demesne with the highest labour inputs, 13.4 man-days were used per acre, on a demesne comprising 432 statute acres with a potential workforce of 300. Indeed, she estimates only about a third of the potential workforce would have been required on the demesne: E. Karakacili, 'English agrarian labor productivity rates before the Black Death: a case study', *JECH* 64 (2004), p. 34; and ead., 'Peasants, productivity and profit in the open fields of England: a study of

economic and social development' (Unpublished PhD thesis, University of Toronto, 2001), pp. 92, 148.

¹⁴ D. Farmer, 'Prices and wages', in Hallam (ed.), *AHEW*, II, pp. 715–817.

¹⁵ A discussion of this can be found in J. Hatcher, 'Unreal wages: long-run living standards and the "golden age" of the fifteenth century', in B. Dodds and C. D. Liddy (eds), *Commercial activity, markets and entrepreneurs in the middle ages: essays in honour of Richard Britnell* (2011), especially pp. 13–14. Under- and unemployment due to overpopulation is noted in Campbell, 'Agrarian problem', p. 9.

I

Our knowledge of agriculture in medieval England is largely based on manorial accounts, which record the practices of landlords in unparalleled detail. However, although invaluable for the study of the agrarian economy, these accounts shed little direct light on the agricultural practices of peasants.¹⁶ How far can it be assumed that the techniques detailed in the manorial accounts and used on demesnes were applied in the same way, or to the same extent, on peasant lands? After all, lords and peasants had access to different quantities and qualities of resources, including land, labour and livestock. Both lords and peasants no doubt sought to achieve their production aims by utilizing their resources most effectively, but it is also likely that varying constraints meant they differed in the means by which they did this.

We cannot escape the fact that manorial accounts document the running of demesnes rather than peasant holdings. We can, however, use the sources we have in ways which will help illuminate aspects of medieval agriculture which would make sense on smallholdings, and from this to posit suggestions for understanding peasant cultivation techniques. To do this, we must not only examine the written evidence from a different perspective, but also look beyond documentary sources to the variety of visual and physical remains of the material culture of the past.¹⁷ The intent is not to create long series of data, but rather to be alert to small details, to ask why the detail is there and what might be gleaned from it. It is often an exercise in looking for what is not there, as much as what is.

A striking feature of manorial accounts is how few hand tools are listed. Yet numerous images in illuminated manuscripts, religious iconography, archaeological remains of iron implements, and indeed other types of written record, demonstrate that hand tools were ubiquitous in medieval agriculture. That these implements are found only in very small numbers in manorial accounts, however, suggests not only that labourers brought their own tools with them when they worked on the demesnes, but also that these tools might have played a more prominent role on peasant land than on demesnes. Through careful examination of a variety of sources, we identify three techniques, barely noted in demesne accounts, which were likely prominent on peasant holdings: spade cultivation, intensive weeding with hooks and by hand, and planting legumes. These methods were particularly suited to the cultivation of smallholdings because of the amount of land and the type and quantity of labour available to smallholding peasants. From this, we suggest that high levels of arable output may have been achieved through the labour-intensive use of small-scale technologies.

This does not mean that peasants created large amounts of surplus, either in cash or in kind. High land productivity was both a cause and, importantly, a consequence of population growth. That this drove peasants to develop a package of techniques which involved exhaustingly high

¹⁶ Exceptions to this are manorial accounts, which include tithes in cash, and especially in kind, and lay subsidy receipts. See for example, B. Dodds, 'Estimating arable output using Durham Priory tithe receipts, 1341-1450', *EcHR* 57 (2004), pp. 245-85; Sapoznik, 'Productivity'; M. M. Postan, 'Village livestock in the thirteenth century', *EcHR* 15 (1962), pp. 219-49.

¹⁷ This necessitates an understanding of the specific problems of each type of source material, a method which has been labelled 'source pluralism'. J. Myrdal, 'Source pluralism as a method of historical research', in S. Fellman and M. Rahikainen (eds), *Historical knowledge* (2012), pp. 155-89.

labour inputs in order to overcome land shortages, allowing them to achieve a subsistence existence while living off of decreasing amounts of land, is further indication of the economic difficulties of the period. Yet it also begins to explain how the population of England grew even in the face of these adverse conditions, and earned a living off increasingly small holdings.¹⁸

II

Many years ago, M. M. Postan wrote that the 'inertia of medieval agricultural technology is unmistakable'.¹⁹ Yet perhaps the cumulative impact of seemingly small technological changes on agricultural productivity has been overlooked. One such innovation is the iron-shod spade, which seems to have developed in Roman Britain and subsequently spread along the borders of the late Roman Empire. As the population of Europe fell during the early Middle Ages, the iron-shod spade fell out of use in many regions. But in the centuries around the year 1000, it became increasingly prevalent across northern Europe. Spade cultivation has received little detailed attention within an English context.²⁰ Yet sources from across northern Europe indicate the prevalence of peasants who performed *corvée* with spades and hoes because they owned no ploughs or teams.²¹ That there existed in England, too, a group of peasants with small holdings who, as a consequence of their poverty, did not have animals for a plough team or ploughing equipment is evident sources which detail labour services. For example, at the Ramsey Abbey manor of Barton-in-the-Clay (Bedfordshire) in 1254–55, each yardlander holding 30 acres was to plough half an acre of the lord's land, 'if he [had] his own plough team'. But if not, he was able to join with up to seven other men 'if their means stretch no further', and together all eight men were required to plough only half an acre. At Banstead in Surrey in 1325, tenants with 15 acres who did not have a plough team with which to perform ploughing services were instead to 'delve four day works'.²² These records suggest that even with 15 to 30

¹⁸ This is the 'slum' agriculture described by Langdon, which may also have been a factor driving down holding sizes: J. Langdon, 'Technology, labour opportunity and inventive thinking in medieval England', in M.-L. Hechmann and J. Röhrkasten (eds), *Von Nowgorod bis London: Studien zu Handel, Wirtschaft und Gesellschaft im mittelalterlichen Europa: Festschrift für Stuart Jenks zum 60. Geburtstag* (2008), p. 446.

¹⁹ M. M. Postan, *The medieval economy and society: an economic history of Britain in the Middle Ages* (1972), p. 44.

²⁰ Dyer, *Standards of living*, p. 171; J. Langdon, *Horses, oxen and technological innovation: the use of draught animals in English farming from 1066 to 1500* (1986), pp. 174, 195.

²¹ E. Thoen, 'The birth of "the Flemish husbandry": agricultural technology in medieval Flanders', in G. Astill and J. Langdon (eds), *Medieval farming technology*, pp. 69–88; J. David, 'Spade cultivation in Flanders', *Tools and Tillage* 5 (1984), p. 10. For peasants

who were to work the land by hand see M. Bloch, *Feudal society* (1961), p. 195 (France); L. Verriest, *Le polyptyque illustré dit 'Veil rentier' de Messire Jehan de Pamele-Audenarde* (1950), fos 98v, 115v, 144r, 156v (Flanders); B. Poulsen, 'Agricultural technology in medieval Denmark', in Astill and Langdon (eds), *Medieval farming technology*, p. 136 (Denmark). For spade cultivation of gardens and small fields see A. Derville, *L'agriculture du nord au moyen âge: Artois, Cambresis, Flandres wallonne* (1999), pp. 101–2, 117–18; indications of this are also found in the *Sachsenspiegel*: M. Dobozy, *The Saxon Mirror: a Sachsenspiegel of the fourteenth century* (1999), pp. 110, 139 (Germany).

²² G. C. Homans, *English villagers of the thirteenth century* (1941), pp. 80, 77. At Bugthorpe, Yorks. even tenants holding two bovates might not own their own plough: T. A. M. Bishop (ed.), 'Extents of the Prebends of York', *Miscellanea*, IV (Yorks. Archaeological Soc. Rec. Ser. 94, 1937), p. 11.

acres it was possible that a peasant might have neither plough nor team, casting some doubt on the suggestion that 10 acres was the almost universal threshold for plough-ownership.²³

That not all tenants with more than 10 acres had ploughs is clear from the inventories made in the immediate aftermath of the Black Death on the estates of Durham Cathedral Priory, although plough ownership was certainly related to the size of a holding. Of the 60 holdings of 18 acres for which an inventory was recorded, 67 per cent had at least one plough, compared with 43 per cent of the 23 holdings between 11 and 18 acres, while just one plough appears in the 39 inventories of holdings of ten acres or less, this being a nine-acre holding.²⁴ Peasant inventories in Worcestershire demonstrate a similar pattern, showing that even in the late fourteenth and early fifteenth centuries, a period of rising living standards, peasants with less than half a virgate were more likely to own spades than ploughs, with three of nine inventories for holdings of this size listing spades and none listing ploughs or plough parts.²⁵

Of course, the plough itself was only part of the equation. Another important factor was the plough team. Postan and Titow's analysis of the Bishop of Winchester's estates suggested that by the turn of the fourteenth century 40 per cent of peasants were too poor to own livestock with which to pay heriots.²⁶ Although this may underestimate the draught animals present, it nonetheless suggests that a sizeable proportion of the population did not own even a single animal to put to the plough. Again, this is corroborated by the Durham inventories, in which only six of the 60 holdings of more than 18 acres included no draught animals, compared with 30 of the 39 holdings of ten acres or less.²⁷ Although the Durham inventories are probably incomplete, they nonetheless indicate very few ploughs overall and very little draught power. Plough-sharing and various iterations of co-aration would have improved this situation to some extent, allowing even smaller-holding peasants access to the plough.²⁸ Nonetheless, the apparent dearth of draught animals would have hindered the ability of large numbers of peasants to come together to form plough teams, and many peasants with little land must have been drawn to other methods of cultivation.

This is all the more interesting given the emphasis on both ploughs and draught animals in the manorial accounts and the lack of attention to the spade in the major English agricultural treatises of period, Walter of Henley's *Husbandry* and the anonymous *Seneschaucy*. These treatises were written for a seigneurial audience, replete with ploughs, and for whom hiring workers to dig with spades would not have been cost-effective. Yet Walter notes that spades should be used to turn the ploughed soil, while the *Seneschaucy* considers digging ditches to

²³ Langdon, *Horses, oxen*, pp. 95–6.

²⁴ Figures include only those entries with inventories: Durham Cathedral Muniments (DCM) Loc. IV 141, Inquest on free tenants who died in the Plague, DCM Loc. IV 146–7b, Inquest on tenants who died in the Plague; see also R. A. Lomas, 'The Black Death in County Durham', *J. Medieval Hist.* 15 (1989), pp. 132–3.

²⁵ In contrast to peasants with between a half and a whole virgate, all five of whom had ploughs or plough parts, as did five out of six peasants with a virgate or more: R. K. Field, 'Worcestershire peasant buildings,

household goods and farming equipment in the later Middle Ages', *Medieval Archaeology* 9 (1965), pp. 137–45; Lomas, 'The Black Death in County Durham', p. 133.

²⁶ M. M. Postan and J. Z. Titow, 'Heriots and prices', in M. M. Postan, *Essays on medieval agriculture and general problems in the medieval economy* (1974), pp. 161–2; J. Longden, 'Statistical notes on Winchester Heriots', *EcHR* 11 (1959), p. 413; this is an increase from the thirteenth century.

²⁷ DCM Loc. IV 141, DCM Loc. IV 146–7b.

be one of the tasks of the ploughman.²⁹ Indeed, it appears that this is precisely what happened on the Bishop of Ely's manor of Wisbech (Cambs.), where iron-clad shovels are listed in the plough accounts.³⁰ Such complementary work is further demonstrated in the late fourteenth-century poem, *Piers Plowman*, in which Piers is helped in his work by the pilgrims who 'dugged up the balkes' alongside the plough, and later, 'ditchers and diggers dug up the ridges'.³¹ The spade also supplements the plough in a subsequent passage, in which the hermits, working alongside Piers, 'laid hands on spades', digging 'dirt and dung to drive off hunger'.³² Here spadework is associated with poverty, and, importantly, with productivity, suggesting that the spade had an important role in cereal cultivation, particularly for the poor peasant, even in the later Middle Ages.

Strong evidence for the importance of the spade to the agriculture of the medieval peasantry comes from non-textual sources, for this period also saw the increasing prevalence of the spade in English art. The backbreaking nature of spadework made it most suitable for cultivating small parcels of land. Indeed, it is within this context of poverty and smallholding, and the dire subsistence-level straits in which many peasants must have found themselves, that artistic images of the spade became common over our period. This is most pronounced in the development of Adam-iconography over the high medieval period. The eleventh century saw an increase in the prominence given to images of Adam and Eve in their toil, a development associated with increased emphasis on hard work for the survival of society as a whole, which itself is indicative of an important change in ideology during the high Middle Ages.³³ Yet whereas the earliest images of Adam working, which date from the ninth century, depict him working with an ard, from the turn of the eleventh century Adam is shown working the land by hand with a hoe or, more commonly over the thirteenth century, an iron-shod spade.³⁴ This

²⁸ Langdon, *Horses, oxen*, pp. 235–41. Although Langdon notes that instances of co-aration on demesnes were probably greater in number in the thirteenth century than the twelfth, given the 'population growth of the period, as declining levels of land and livestock per person', he also notes the relative paucity of indications of plough-sharing agreements in court rolls: *ibid.*, pp. 236, 239. Two examples of sharing ploughs are found in the Wakefield court rolls between 1286 and 1316: in 1286 two men were supposed to plough their land together, but one of them did not come, leaving the other's land unploughed; and in 1307 an agreement that one tenant plough another's land was broken. Two instances of taking other tenants' animals to attach to the plough should also be noted at Wakefield: a heifer was yoked to a plough in 1297, the fine for which was 6d., and that same year an ox taken to plough for three days, for which offence the fine was 4s.: W. P. Baildon *et al.* (eds), *Court rolls of the Manor of Wakefield* (Yorks. Archaeological Soc. Rec. Ser. 29, 36, 57, 78, 109, 1901–45), III, pp. 161–2; II, p. 90, 7; I, p. 284.

²⁹ See Harvey's comments on Walter of Henley: P. D. A. Harvey, 'Agricultural treatises and manorial

accounting in medieval England', *AgHR* 20 (1972), p. 181; and D. Oschinsky (trans. and ed.), *Walter of Henley and other treatises on estate management and accounting* (1971), pp. 283, 321.

³⁰ For example Cambridge University Library, EDR, D8, Box 1, Roll 14 (1340–41).

³¹ W. Langland, *Piers Plowman*, ed., E. Robertson and S. H. A. Shepherd (1990), pp. 100, 101.

³² *Ibid.*, p. 105.

³³ M. Camille, "'When Adam delved": labouring on the land in English medieval art', in D. Sweeny (ed.), *Agriculture in the middle ages: technology, practice, and representation* (1995), pp. 247–76; G. Duby, *The three orders: feudal society imagined*, trans. A. Goldhammer (1980).

³⁴ The spatial and chronological distribution of this change is detailed in J. Myrdal and A. Sapoznik, 'Spade cultivation and intensification of land use, 1000–1300: written sources, archaeology and images', in Jan Klapste (ed.), *Agrarian technology in the medieval landscape*, (*Ruralia* 10, 2016), pp. 203–23. The salient point here is the almost universal depiction of the iron-shod spade in manuscripts originating in England.

is of course the foundation of the proverb, 'When Adam delved and Eve span', the first known formulation of which is from England in the late fourteenth century, and which subsequently spread across northern Europe. There is every reason to think this trope was already well known long before the proverb was so famously quoted in John Ball's sermon during the Peasants' Revolt of 1381, for plays dating from the twelfth century depict Adam digging and Eve spinning.³⁵

It is notable that at the same time as images depicting Adam delving became common, a man digging with a spade became the increasingly accepted image representing March in northern European labours of the month. In England, where labours of the month were particularly focused on depicting agricultural work, the two earliest surviving examples of labours of the months (BL Cotton Julius A vi and BL Cotton Tiberius B v) both dating from the early eleventh century, show iron-shod spades being used in the fields, and this type of spade iconography was highly developed by the twelfth century.³⁶

In his classic study of the use of the horse in medieval agriculture, John Langdon argued that 90 per cent of land in England was cultivated with the plough, while the remaining 10 per cent, lying mostly in small crofts and gardens, was cultivated by hand.³⁷ Yet the growing iconographic importance of the spade in medieval art suggests that the spade was a tool commonly associated with cultivation. Of the famously intensive and productive 'Flemish husbandry' which developed over the thirteenth and fourteenth centuries, Erik Thoen has written that the 'shift from the plough to the more labour intensive spade was the most characteristic change'.³⁸ It seems reasonable to think that medieval English cultivators, who also spent so much of their time diverting water away from their crops, would have made use of their spades in similar ways.

It is well known that spade cultivation became an increasingly important facet of agriculture in the nineteenth century, another period of population increase when pressure on resources grew at a remarkable rate. The spade's superior ability to improve the quality of the soil by pulverizing it more effectively and allowing for more assiduous weeding led to high yields on spade-cultivated lands, even when compared with land cultivated by the improved ploughs of the period.³⁹ Indeed, spade cultivation among other labour-intensive techniques led to wheat yields that were twice as high on nineteenth-century English allotments as they were in arable fields – an enormous difference.⁴⁰ In the absence of directly comparable evidence, it cannot be said that the productivity of spade cultivation was so great in the medieval period and

³⁵ See for example the Anglo-Norman 'Jeu d'Adam': L. R. Muir, 'Adam, a twelfth-century play translated from the French with an introduction and notes', *Proc. Leeds Philosophical and Literary Soc.* 13 (1970), pp. 149–204.

³⁶ J. C. Webster, *The labours of the months in antique and medieval art: to the end of the twelfth century* (1938).

³⁷ J. Langdon, 'Agricultural equipment', in G. Astill and A. Grant (eds), *The countryside of medieval England* (1988) p. 88; a similar phenomenon is found at Cuxham, where peasants with no land in the fields and no livestock cultivated their crofts with corn by

hand: P. D. A. Harvey, *A medieval Oxfordshire village: Cuxham, 1240–1400* (1965), p. 134.

³⁸ Thoen, 'The birth of "the Flemish husbandry"', p. 81.

³⁹ See for example David, 'Spade cultivation in Flanders' for Belgium. F. Valen-Sendstad *Norske landbruksredskaper 1800–1850* (1964) pp. 28–38 and K. Visted and H. Stigum *Vår gamle bondekultur* 1 (1971), pp. 196–9 for Norway.

⁴⁰ J. Burchardt, *The allotment movement in England, 1793–1873* (2002), pp. 156–9.

certainly there is a difference between the iron-shod spade of the Middle Ages and the modern all-iron spade. Yet it is likely that these same attributes did make spade cultivation attractive to smallholding peasants in the Middle Ages, for the importance of hand cultivation in the centuries after the year 1000 appears to have been a common phenomenon across the whole of northern Europe.⁴¹

The productivity potential of the spade was partly because it could be used in nuanced and varied ways to build up ridges and dig down furrows depending on particular soils, levels of moisture, and vagaries of landscape. But spade cultivation was enormously labour-intensive, best suited to the cultivation of smallholdings, crofts, gardens, and small parcels of land not easily accessible to the plough, and under economic circumstances in which raising yields meant that the family had enough to eat, rather than hiring labour in order to increase the amount of grain which could be sold. Yet for those smallholding peasants, too poor to own plough parts or teams, whose livelihood depended upon the productivity of their arable land, it seems likely that the spade was crucial to cereal cultivation.

This highlights a fundamental difference between the economics of demesne farming and that of the smallholding peasant. Analysis of the seigneurial sector has demonstrated time and again that lords sought to maximize profit, and that this did not always mean maximizing production, for the cost of labour was a constant concern. For peasant producers, especially smallholding peasants driven by subsistence needs in a period of high competition for wage labour, it was maximum production that mattered, for they consumed what they produced and their labour was abundant. Thus labour-intensive spade cultivation made sense for this sector, when it did not for lords.

The evidence discussed above suggests that cultivation techniques can be considered on a continuum, with land only cultivated by ploughing on one end, and land only cultivated by spades on the other. Toward the ploughing side were lords and wealthier peasants, whose holdings were too large to make spade cultivation feasible, and for whom the benefits of intensive cultivation did not offset the time or cost of the labour. At the other end were smallholding peasants and cottagers, particularly those with few other employment opportunities, who were very heavily reliant upon their holdings for their livelihood, and were consequently likely to expend a great deal of time and energy on the preparation of the soil. Yet these were two extremes, and between these points lay innumerable possibilities for variations in the proportions of spadework and ploughing, depending on the circumstances of each household, including holding size, labour supply and potential for co-aration and extra-arable income.

III

The productivity gains made possible through assiduous preparation and maintenance of soil would have been lost without further care taken over the crops once they were planted. Thorough weeding was another labour-intensive and time-consuming task necessary for the success of arable crops. Medieval fields were notoriously unclean, rife with thistle and stinking

⁴¹ Myrdal and Sapoznik, 'Spade cultivation'.



FIGURE 1: Long-handed weeding hook illustrated in the Luttrell Psalter
(© The British Library Board Add. MS 42130, fo. 162)

mayweed.⁴² These weeds competed with grain for nitrogen and other soil nutrients, potentially lowering corn yields, but they also diminished the viability of the straw for fodder, especially for cattle, adding further pressure in regions where pastoral resources were scarce.⁴³ Thus in this period of rising arable productivity and intensification of land use, the long-handed weeding hook, an invention of the high middle ages, developed and became prominent (Figure 1).⁴⁴

This implement was particularly well adapted to densely growing grain and intensive arable agriculture. The iron weeding hook, shaped like a very small sickle, was used in conjunction with a forked wooden stick. Together these two implements allowed workers to cut or pull the weed while still remaining upright, attacking weeds with targeted precision. Importantly, the long handles also meant that weeding could be done in broadcast-sown and mature grain without walking out into it, and medieval images often depict this task being done from the balks rather than in standing in the grain itself.⁴⁵ Indeed it is possible that the weeding hook was so well suited to this task that it also supplanted the small hoe-like spud, which had been prominent in an earlier period.⁴⁶

⁴² These two weeds were mentioned by name in the Cuxham account for 1319, in which 256 day works were spent pulling mayweed (*amarissa trahenda*) and 204 day works were spent cutting thistles (*cardonibus cindendis*): P. D. A. Harvey, *Manorial records of Cuxham, Oxfordshire: circa 1200–1359* (1976) p. 339. J. Letts, *Smoke-blackened thatch: a unique source of late medieval plant remains from southern England* (1999).

⁴³ Cattle and sheep avoid mature thistle and stinking mayweed, the latter can also taint milk if eaten in quantity. Horses will eat thistle, but like most livestock, avoid mayweed.

⁴⁴ Langdon, 'Agricultural equipment', p. 99.

⁴⁵ This is very clearly shown in the Luttrell Psalter, below, n. 52; also for example the Oscott Psalter, BL, Add. Ms 50000, fo. 3v (England c.1265–70); although it was not always the case: The York Psalter, BL, Add. Ms

54179, fo. 3v (England c.1260).

⁴⁶ The tool described as a 'spud' for weeding was relatively more common in the Roman period, which was characterized by its wide variety of hoes, than in the medieval. The spud was a narrow socketed blade on a straight shaft which chopped down into the soil to cut the roots of weeds. The Roman blades, however, can be interpreted differently: if their wooden shafts, which are not preserved, were curved, they would have been small hoes. Goodall's compilation shows that when weeding hooks were common, the narrow blade of a hoe or spade was rare. It may also be suggested that the spud was used in conjunction with the plough, either to clean the mouldboard, or to break up soil alongside the plough, a task corroborated by the Wisbech accounts, many of which include the purchase of an iron *rastrum* the definition of which

Manorial accounts demonstrate that by the mid- to late-thirteenth century, extensive weeding was carried out on demesne lands, often by hired wage labourers.⁴⁷ Yet behind the aggregate sums of days worked weeding and the expense of this labour in services or money lies a practical issue regarding how and when that work was actually performed. Here a distinction should be made between weeding the fallow and weeding in growing grain. Unsown fields could be weeded by ploughing. Indeed, Walter of Henley prescribed two ploughings of the fallow, the first relatively deep and followed by a second, shallower, ploughing which was deep enough to attack the thistles but not so deep as to make the furrows fill with water.⁴⁸ Such intensive preparation of the fallow was a potentially expensive undertaking, and while Harwood Long doubted the possibility for deep ploughing and Postles questioned the extent to which lords really had their land cleaned in this way, the existence of 'fallow ploughs' without irons suggests that some lords did carry out this task to some degree and manorial accounts frequently mention ploughing the fallow.⁴⁹

Weeding the fields once the grain was sown was a different task altogether. Manorial accounts list weeding under variants of the headings *sarclacio* or *sarculatio*, a task commonly specified as being undertaken as the crops were growing.⁵⁰ This task is typically translated into English as 'hoeing', presumably based on the classical Latin.⁵¹ Yet the destruction caused by hoeing in growing grain sown by broadcast would surely exceed the benefit gained from removing weeds. In fact, medieval images of weeding show this task being performed not with hoes, but rather with hooks.⁵² The hoe of the Romans, from which the word *sarculus* came into medieval usage, could be single-pointed or two-pronged, the latter not dissimilar in shape to the medieval weeding hook, and so it seems that by the time the task appears in manorial accounts, the classical word for the Roman hoe was being used to describe a new instrument for which there was no pre-existing word. Thus the Roman *sarculus* became the medieval weeding hook.⁵³

Note 46 continued

may variously be hoe or mattock, and by extension a 'spud'. As with many implements, it probably had several functions. S. Rees, *Agricultural implements in prehistoric and Roman Britain* (BAR British Series 69, 1979), pp. 330–1; K. D. White, *Agricultural implements of the Roman world* (1967), pp. 36–68; I. H. Goodall, *Ironwork in medieval Britain: an archaeological study* (2011), pp. 80–2; for example EDR, D8, Box 2, Roll 2 (1347–48).

⁴⁷ D. Postles, 'Cleaning the medieval arable', *ECHR* 37 (1989), pp. 130–43; Stone, *Decision-making*, pp. 70–1.

⁴⁸ Oschinsky, *Walter of Henley*, p. 321.

⁴⁹ Postles, 'Cleaning', pp. 139–42; for example: at Michelmersh in 1311 (J. S. Drew, 'The Manor of Michelmersh near Romsey, Hants: an English translation of a rental and custumal, rolls and manor court rolls (1248–1331) preserved in Winchester Cathedral Library' (ts at the Institute of Historical Research, 1943); Gamlingay (Merton College Oxford, 5392, 1339–40); Waltham (N. Holt (ed.), *The Pipe Roll of the Bishopric*

of Winchester, 1210–1211 (1965), p. 115). Harwood Long doubted that ploughs would have been able to cut very deep at all, and it should be noted that spades were probably better suited to the task of deep cultivation: W. Harwood Long, 'The low yields of corn in medieval England', *ECHR* 32 (1979) p. 369.

⁵⁰ 'In blado sarclandis': for example Holt (ed.), *Winchester Pipe Roll, 1210–11*, pp. 57 (Brightwell), 65 (Witney), 141 (Sutton).

⁵¹ For example, F. Page, *Wellingborough manorial accounts: AD 1258–1323* (1936), p. 138 (glossary); J. L. Fisher, *A medieval farming glossary* (1968) p. 31; R. E. Latham et al. (eds), *Dictionary of medieval Latin from British sources* (17 vols, 1975–2013), p. 2937.

⁵² See for example the Luttrell Psalter: BL, Add. MS, 42130 fo. 172r (Lincolnshire, England, c.1320–40); this is also the method shown in *Labours of the Months*, below. The hoe is conspicuous in its absence in medieval English iconography.

⁵³ This was in fact the dictionary definition of *sarculus* in the seventeenth century: C. Wase, *Dictionarium*

Later evidence clearly supports this point: in his section on weeding, the early sixteenth-century writer Fitzherbert makes no mention of hoes, describing instead two types of long-handled weeding implement, one un-ironed for use in wet soils and one ironed for hard, dry soils.⁵⁴ The un-ironed implement would have been cheaper than that which was ironed, and could have been made by peasants themselves. Although this evidence comes from a later period, finds of medieval iron weeding hooks show the tool to have been very common during this period, and there is no reason to think that the simpler, all-wooden apparatus of a similar shape would have been a later innovation unknown to medieval cultivators.⁵⁵ The use of two different instruments based on soil conditions is further evidence of the deeply considered approach to soil maintenance and the important role of hand tools in medieval agriculture. Again this has implications for understanding the type and amount of labour needed for this task, and it is a sign of how important weeding was to the medieval agricultural year that Labours of the Months over the twelfth century came to represent June as a man weeding with hooks, a motif Webster considered to be 'distinctively English'.⁵⁶

Thistle was probably the most strenuously fought weed, both because of the ferocity with which it grew, and because its thick stalks made harvesting with sickles even more difficult.⁵⁷ Thistle is a perennial that uses its intercalated reserve nutrition in the spring and early summer to reproduce. Once the shoot reaches its bud stage, the deep root system has lost much of its nutrients. By destroying the shoots at precisely this time the plant will be weakened – any earlier or later, and the thistle will thrive and spread. It is for this reason that Walter of Henley advised weeding after the Feast of St John the Baptist (24 June), for to begin earlier would encourage thistles to grow.⁵⁸ This required a great deal of work expended over short periods of time. The amount of labour lords were willing to put towards weeding was a considered and profit-driven balance between the cost of labour and the sales price of the grain produced by that labour.⁵⁹ In periods of high grain prices and low wages, as in the late thirteenth and early fourteenth centuries, lords expended a good deal on labour of all kinds, including weeding.⁶⁰ But the type of labour put towards weeding on demesne land was highly dependent upon the

Note 53 continued

minus, a compendious dictionary English-Latin and Latin-English (1675). Similarly, *tribula* no longer meant threshing sledge but rather shovel (although note mistranslation in Page, *Wellingborough*, fo. 22).

⁵⁴ W. Skeat (ed.), *The book of husbandry by Master Fitzherbert* (1882), p. 31.

⁵⁵ Goodall, *Ironwork in medieval Britain*, pp. 80–1.

⁵⁶ Webster, *Labors of the months*, p. 93; see for example St John's College, MS K.30 (England, c.1190–1200) which depicts weeding in June and delving with an iron-shod spade in March.

⁵⁷ This was noted by Fitzherbert in 1534: *Book of husbandry*, p. 29.

⁵⁸ Oschinsky, *Walter of Henley*, p. 323. Many lords appear to have followed this advice, and weeding was often most vigorously undertaken in the weeks around

midsummer, late June and early July, when thistle was at its most vulnerable, a time noted in some Ramsey Abbey accounts as the *tempus sarclandi*. For Ramsey: Postles, 'Cleaning', p. 136; Stubbington: Winchester College Muniments, 15379. Extra weeding because of thistles, and weeding specifically aimed at thistles, is noted for example on the demesne of the Westminster manor of Kinsbourne: D. Stern, *A Hertfordshire demesne of Westminster Abbey: profits, productivity and weather*, ed. C. Thornton (2000), pp. 93–5. Similarly short periods of concentrated weeding are demonstrated in the accounts of the Durham Priory manor of Pittingdon in 1277–78: R. H. Britnell (ed.), *Durham Priory manorial accounts, 1277–1310* (Surtees Soc., 218, 2014), p. 11.

⁵⁹ Stone, *Decision-making*, pp. 238–41.

⁶⁰ Miller and Hatcher, *Medieval England*, pp. 213–24.

economic circumstances of the lord. Hired labour was more productive than customary labour, as Stone has demonstrated, because the latter was compulsory and therefore not competitive, and furthermore it was assigned by holding and unlikely to attract the best worker from a household.⁶¹ The profit-oriented nature of demesne agriculture meant that lords were typically willing to spend money on weeding only as long as the value of the extra grain produced exceeded the cost of labour. The point at which the wage bill was no longer offset by the additional income derived from higher grain yields was very likely well short of the maximum increase yields which could be achieved from the application of extremely high amounts of labour, such as would have been applied on the lands of smallholding peasants. This is not to say that lords necessarily placed a low value on grain straw, but rather that they placed a lower value on it than did smallholding peasants because they, the lords, had access to more of it, or to greater quantities of additional fodder.

Family labour was clearly more incentivized than customary labour, but also rather more than wage labour, perhaps especially in a period of low wages and chronic underemployment. Furthermore, images such as that from the Luttrell Psalter show both men and women weeding with hooks, suggesting that this task was not gender-specific and thus the labour could be spread across all members of the household.⁶² In addition to this, the implements themselves were relatively simple, much cheaper than fallow ploughing advocated by agricultural treatises, and, like the spade, allowed for very precise and thorough work. A peasant family could also undertake this task at the precise time when it was needed, because the size of their plots was smaller in relation to the workforce available. Furthermore, the general efficacy of the labour force on peasant lands may have further enjoyed a comparative advantage, if indeed peasants tended not to send their best labourers to work the lords' demesnes. Weeding by hand was also probably the task of women and children, whose labour is chronically under-recorded in medieval accounts; children also helped throughout the growing season by chasing away birds which ate the corn.⁶³ Thus women and children had important roles in cereal cultivation, perhaps especially so on peasant smallholdings.

Although time-consuming, attentive weeding was worth the effort, for competition from weeds was an important factor in lowering medieval yields.⁶⁴ For peasant households, high land productivity was the crucial outcome, and lower marginal returns on otherwise underemployed labour were of less concern than for their lords. By considering the details of how agricultural tasks were actually performed, we can see that peasant agriculture was productive not simply because small farmers were able to apply more work per land unit, but rather that they were able to carry out specific tasks with greater precision and efficiency. The two ideas are intrinsically linked, and together serve as a reminder that the production increases derived from even diminishing marginal returns on labour were important to smallholding peasants, and this was probably increasingly true as the thirteenth century wore on.

⁶¹ Stone, 'Productivity', p. 654.

⁶² BL, Add. Ms 42130 (Luttrell Psalter), fo. 172r; women are sometimes specifically mentioned in manorial accounts, for example at the Durham Priory manor of Belasis in 1305–06, where 25 women weeded for 10 days at a cost of 10s. 5d: Britnell (ed.), *Durham Priory*

manorial accounts, p. 59.

⁶³ D. Banham and R. Faith, *Anglo-Saxon farms and farming* (2014), p. 60; J. Claridge and J. Langdon, 'The composition of *famuli* labour on English demesnes, c.1300', *AgHR* 63 (2015) pp. 202–4.

⁶⁴ Long, 'Low yields'.

IV

Campbell has emphasized extensive cultivation of legumes as one of the most important components of high-yielding demesne cultivation regimes.⁶⁵ By fixing atmospheric nitrogen in the soil, leguminous crops replenished nutrients, allowing the amount of land left fallow each year to be decreased, while at the same time providing a source of food and high quality fodder. The latter was important because the quantity and quality of fodder is directly related to the amount of manure available for fertilizing crops. Consequently, legumes became increasingly prominent on demesnes across the country over the late thirteenth and early fourteenth centuries, where they were followed in rotations by nitrogen-demanding cereal crops.⁶⁶

The positive effects of legumes on yields were of course also known to peasants, and indeed evidence from peasant land suggests that peasants may have grown proportionately more legumes than did their lords: Le Poutre, for example, has recently argued that legumes were twice as prominent on peasant lands than on demesnes.⁶⁷ The prevalence of pea bread and pottage in the diets of the very poor is further indication of the importance of peas for human household consumption. We must envisage that much of the pea crop was consumed by the people that grew it. But legume cultivation, which also provided fodder for livestock, was also so important on peasant land because access to meadow and pasture were often strictly regulated. Resource allocation for peasants with small holdings was therefore a negotiation in which competition for resources and dependence among sectors set the parameters for the balance between pastoral and arable production.⁶⁸ Arable fodder was therefore a vitally important means by which peasants could support their livestock, an even more pressing concern in regions where grass was not plentiful.

This pressure meant that the importance of legumes lay not simply in the proportions in which they were grown, but also in the yields they could be coaxed to attain. In this, the method by which they were put in the soil could have had a significant impact. Peas could be sown either by broadcast or planted with a dibbler.⁶⁹ Planting meant that the seeds could be put deeper in the soil. In general, seeds should be covered with soil to a depth of ten times the diameter of the seed. Thus peas, and especially beans, should be put down deeper than grain. Peas and beans are also palatable to birds, and their larger size make them easier to pick up than grain. If not immediately pressed into the soil much of the seed would have disappeared, and harrowing had to be done very soon after broadcasting the seed. With planting, this problem disappeared.

⁶⁵ Campbell, 'Agricultural progress', pp. 32–3.

⁶⁶ Campbell, *English seigniorial agriculture*, pp. 228–9; Stone, *Decision-making*, pp. 62–5; their role in enriching the soil is even remarked upon in manorial accounts: for example, C. Thornton, 'Determinants of land productivity', in B. Campbell, and M. Overton (eds), *Land, labour and livestock: historical studies in European agricultural productivity* (1991), p. 196.

⁶⁷ H. J. P. Le Poutre, 'The contribution of legumes to the diet of English peasants and farm servants, c.1300', *AgHR* 63 (2015), pp. 19–38; see also Sapoznik, 'Productivity'; Harvey, *Cuxham*, pp. 130–1; Stone, *Decision-making*,

pp. 265–6.

⁶⁸ A. Sapoznik, 'Resource Allocation and Peasant Decision-Making: Oakington, Cambridgeshire, c.1290–1399', *AgHR* 61 (2013), pp. 187–205.

⁶⁹ Described by Bennett; we have, however, been unable to follow the citations given. What follows here is a reworking of the idea: H. S. Bennett, *Life on the English manor: a study of peasant conditions, 1150–1400* (1937), pp. 81, 231. It is also mentioned in C. Dyer, 'Farming practice and techniques: West Midlands', in E. Miller (ed.), *AHEW*, III, 1348–1500 (1991), p. 231.

Planting was obviously much more labour-intensive than broadcasting, but it would also have given a higher yields by conserving more seed and encouraging that seed to take root better.

Indeed, this higher yield must have made planting legumes worthwhile even on demesne lands, for manorial accounts not infrequently record payments for planting (*planteando*) these crops rather than sowing them. At the Winchester manor of Bitterne two bushels of beans were bought 'ad plantandam' in 1210-11, and planting beans was a task specified in the 1265-66 extent of the Gloucester Cathedral manor of Linkeholte.⁷⁰ At Cuxham in 1359 9½*d.* was spent on planting legumes on a piece of curtilage, and at the Winchester manor of Havant 1*s.* 10*d.* were spent on furrowing and planting beans in 1301-02.⁷¹ At Stubbington, planting beans is mentioned several times in the half dozen accounts which survive from 1281 to 1331. Although the cost of labour to perform this task was usually low, suggesting perhaps relatively small amounts were being planted, in 1331 56*d.* was spent on planting three quarters of beans, a clear indication that planting was a viable method even over several acres of land.⁷² Furthermore, at the Ramsey Abbey manor of Elton in 1324-25, 249 works were spent on planting beans, again a quantity of labour suggestive of work in the fields. This task was both cumbersome and labour-intensive, for when properly done a single seed went into a single hole. In 1320 several men were fined for cheating in this work, dropping four or five beans into a single hole.⁷³

Thus although broadcasting seed was doubtless the more common method, planting legumes is also very much in evidence. Stone has remarked upon the higher sowing cost for legumes than for other crops (21½*d.* per acre compared with 18½*d.* per acre for wheat).⁷⁴ This cost differential is slight enough to suggest sowing rather than planting, but perhaps suggests that sowing legumes was slower or more laborious than other crops, possibly requiring extra care.

An interesting aspect of planting versus sowing is that the former was considered women's work. At Stubbington in 1281 4½*d.* was paid for 17 women to work 'pricking in' (*punctuare*) the fields, and in 1320 13½*d.* for six women for the same task, this time after the sown beans had been harrowed.⁷⁵ It seems probable that these women went out to dibble down the beans which still lay on, or close to, the surface of the soil. This can perhaps be characterized as an intermediate method between sowing and planting – although apparently a rather costly one. The extra expense, however, was derived from the extra labour required for the task, which would have affected the extent to which this method was employed on demesnes, but would not have been relevant for peasants using family labour.

Certainly the dibbler or dibble stick was a very old tool, and not an invention of the middle ages. But its existence demonstrates the potential impact of very small tools, which, in the

⁷⁰ Holt (ed.), *Winchester Pipe Roll, 1210-11*, pp. 6 (Bitterne), 57 (Brightwell), 154 (Southwark), 57 (Brightwell); W. H. Hart (ed.), *Historia et cartularium Monasterii Sancti Petri Gloucestriae* (3 vols, 1863) p. 42.

⁷¹ Harvey, *Manorial records*, p. 512; *The Pipe Roll of the Bishopric of Winchester, 1301-2*, ed. Mark Page (Hampshire Rec. Ser., 14, 1996), p. 239. It appears that planting beans was a common practice, for example: CCA, DCC-BR/Eastry/37 (Eastry, Kent, 1311-12) and CCA, DCC-BR/Meopham/8 (Meopham, Kent, 1285-86), both manors of Canterbury Cathedral Priory;

Norwich Cathedral Priory, spent 2*s.* 4*d.* on planting and threshing beans in the garden in 1387-88: C. Noble, C. Moreton and P. Rutledge (eds), *Farming and gardening in late medieval Norfolk. Norwich Cathedral Priory's gardener's accounts* (Norfolk Rec. Soc., 61, 1996, p. 36).

⁷² Stubbington: Winchester College Muniments, 15376a-15382.

⁷³ S. C. Ratcliff, *Elton manorial records, 1279-1351* (1946), pp. 298, 249.

⁷⁴ Stone, *Decision-making*, p. 63.

⁷⁵ Winchester College Muniments, 15379.



FIGURE 2: Men shown ploughing, sowing seed, and digging while women are spinning and carding wool illustrated in the Holkham Bible

(© The British Library Board Add. MS 47682, fo. 6)

garden-like agriculture of the small farmer, may have been used to great effect. Further indication of planting rather than sowing is found in an image in the Holkham Bible (c.1327–40), which, to our knowledge, has not been observed in this context before. The artist of this Bible had a particular fascination with the minutiae of everyday life, an especially rich image of which depicts the progeny of Cain.⁷⁶ In this picture, men are shown ploughing, sowing seed, and digging while women are spinning and carding wool (Figure 2). At the bottom of the picture is a man pruning and, very close by, a man is shown bending down with

⁷⁶ BL, Add. MS 47682, fo.6r (England, c.1327–35).



FIGURE 3: Detail of a man using a planting stick illustrated in the Holkham Bible
 (© The British Library Board Add. MS 47682, fo. 6)

an iron-tipped planting stick in his left hand while in his right hand he is placing a large seed into a hole in the ground (Figure 3). This is, as far as we are aware, the only image depicting what appears to have been a very common task, although more often performed by women, the use of a plant stick. This task is also described in *Le ménagier de Paris*, a French household book from the late fourteenth century, which notes one of the wife's tasks is to plant and tend beans, including covering the shoots with soil to ensure strong growth.⁷⁷

Although little is known of how peasants allocated crops on their land, nonetheless it may be surmised that smallholding peasants used what land they had with great intensity. Under such high-pressure circumstances, especially given the female workforce to hand in household economies, planting may have been more common on peasant than demesne land. This, as already mentioned, gave much higher yields and perhaps this method was not only used for beans, as seems to have been the custom on demesnes, but for peas as well. Thus on small farms legumes provided an opportunity to increase work intensity for rich reward.

V

We have argued that small farmers would have had a number of comparative advantages over their lords with regard to land productivity. Not only would they have been able to invest more labour per land unit, but they would also have been able to fine-tune specific actions through more effective control over their workforce. This is not to say that peasants were better farmers

⁷⁷ *The good wife's guide (Le ménagier de Paris): a medieval household book*, ed. and trans. G. L. Greco and C. M. Rose (2009), p. 209.

than lords and their estate managers *per se*, but rather it highlights the potential for increased land productivity driven by different production goals. Demesne agriculture was most often directed toward the efficient production for market, and this meant that lords had to balance the income derived from sales with expenditure on labour. In contrast, peasant agriculture was largely geared towards immediate household needs. Peasants did not pay family members for their labour and could play on their self-interest. It is therefore important to separate measures which increased land productivity from those which increased labour productivity, for it has been seen that potential increases in land productivity were often achieved through techniques which led to diminishing productivity of labour.

Each agricultural task had a gradient of labour, ranging from intensive to extensive efforts, resulting in varying incremental increases in land productivity, but also decreases in labour productivity. Campbell has shown the gradient of labour investment on lords' demesne lands, demonstrating that in some regions of England lords were able to achieve very high land productivity through high labour inputs.⁷⁸ The components of these highly productive regimes were both land and labour intensive, and thus could only be implemented in regions with good soils and where social and economic conditions made this expenditure of time and money worthwhile. Such land use was profit-oriented, taking advantage of high grain prices and low wages, and consequently took place in highly commercialized regions with high population densities and developed marketing networks, such as eastern Norfolk and parts of Kent. However, in regions where these conditions were not present, profit would also be made by less intensive use of land and labour. This suggests elasticity in demesne production, which was not typical of peasant farming, where reduction of output could have had significant negative effects.

Nonetheless, just as in the seigneurial sector, the point along each task gradient at which a peasant household operated was determined by resource constraints and production aims. What was attractive to one producer because of his economic and household circumstances would have been wholly unappealing or even impossible for another producer working under different circumstances. Consequently, there were numerous technologies from which cultivators could choose. No combination of these was mutually exclusive, and there was much opportunity for overlap, as labour and technical inputs expanded over the period.

A package of techniques existed regarding the investment of labour per area unit, the deployment of which depended upon the circumstances in which medieval cultivators found themselves. For tillage, this gradient ranged from working only with ploughs to the spade-cultivation of small plots. Ploughing was, in theory, ideal for seigneurial agriculture. In reality, however, it was often combined with digging with hand tools, for example to turn over the balks missed by the plough, to break up clods of hard soil, divert rainwater, and weed the fallow.⁷⁹ Of course, peasants who did not own ploughs, plough parts or draught animals could get help with ploughing from wealthier members of the village community. We contend, however, that as the size of holdings decreased and the number of peasants too poor to own draught animals

⁷⁸ Campbell, 'Agricultural progress'.

⁷⁹ Remarked upon by Claridge and Langdon, who note, following Backhouse, that this work, called

'spreading furrows' was probably work for the elderly: Claridge and Langdon, 'Composition', pp. 207–8.

increased, especially over the later thirteenth century, spade cultivation became an important and widespread method of tilling small plots.

In a similar manner, a gradient of labour application also existed for weeding. It is likely that small farmers were able to mobilize the total available workforce in a concentrated attack on their smallholdings. This could be done by hand or with hooks, and again the type of implement and amount of labour used could be adjusted depending on availability, the size of the holding, and the composition of the labour force. Furthermore, the labour-intensive planting of legumes, a crop whose nitrogen-fixing properties were crucial to improving and maintaining medieval grain yields, would also have resulted in higher yields for peas and beans. This technique was best suited to smallholdings and gardens, and again the extent to which peasants engaged in this task would have depended on household circumstances. These are just three of a plethora of labour-intensive agricultural techniques which, when brought together could have contributed to substantially higher levels of land productivity on smallholdings.

Hints of these techniques are to be found in manorial accounts, but they become clear when one considers not only what is written in the documents, but also what is not. Although the accounts often list large implements such as ploughs and carts and their repair in great detail, hand tools are recorded with much less frequency although tasks which must have been performed with these tools, such as digging, weeding and harvesting, are noted in the accounts. Therefore, peasants must have brought their own tools when they came to work on the lords' demesnes. From this it follows that the development of hand tools must have occurred largely outside the seigneurial sector. This development probably took the form of numerous small amendments, and proof of these small changes can be found across northern Europe in images and archaeology. Much of this technology was, quite literally, in the hands of peasants, and would have varied according to soil type and other environmental and social factors. The nature of the sources examined has not made it possible to determine regional variations, although these must certainly have been important. Nor has this been an exhaustive study of the huge range of techniques available to peasants, including those regarding pastoral husbandry. Rather, the study here has sought to identify a sample of representative techniques and to consider a methodology for developing a more detailed picture of medieval peasant agriculture.

In discussing agricultural change and the economic expansion of the high middle ages small-scale farming cannot be overlooked. It is no longer possible to refer to the well-documented seigneurial economy and to assume that what lay outside this sector looked much the same. Careful study of literature, art and archaeology demonstrates that there existed packages of technologies and techniques that are not to be found in manorial accounts. These packages were characteristic smallholding peasants, but not of their lords. Indeed, perhaps they were not even characteristic of peasants with more substantial holdings. Yet, as the population of England grew in the two and a half centuries after the Conquest, the number of smallholding peasants also increased. What has been presented here is only a small sample of the numerous tasks performed by medieval cultivators, and a more complete study is needed before the productivity potential of medieval peasants can be fully understood. If the hypothesis presented here is correct, this group practised forms of labour-intensive, highly productive agriculture, and this has important implications for our understanding of economic growth in the centuries before the Black Death.